MTD90

LICENCE FREE 2-WAY RADIOS

USER GUIDE

CE

ILLUSTRATION

Illustration 1

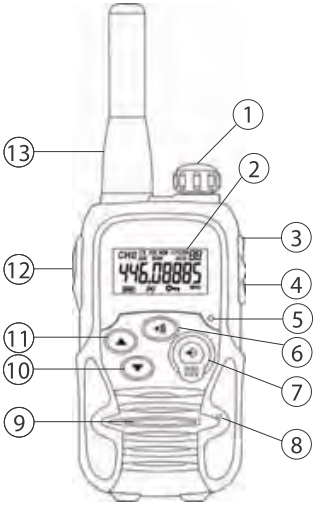


Illustration 2

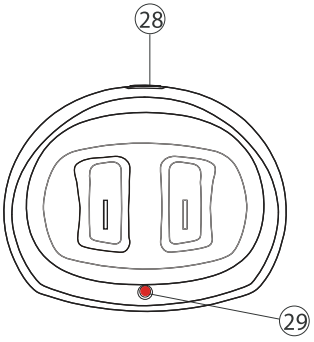


Illustration 3

1 Introduction

Thank you for purchasing the MTD90. It's a long range, low powered radio communication device with a range of maximum 10 Km. It has no running costs other than the minimal cost of re-charging the batteries. The MTD90 operates on 8 channels.

2 Intended purpose

It can be used for recreational purposes. For example: to keep in contact during travelling with 2 or more cars and cycling. Widely used for building sites and to keep in contact with your children when they are playing outside, etc...

3 CE Mark

The CE symbol on the unit, user guide and giftbox indicates that the unit complies with the essential requirements of the R&TTE directive 1995/5/EC.

4 Safety instructions

4.1 General

Please read carefully through the following information concerning safety and proper use. Make yourself familiar with all functions of the device. Keep this manual in a safe place for future use.

4.2 Burning injuries

- If the cover of the antenna is damaged, do not touch because when an antenna comes in contact with the skin, a minor burn may result when transmitting.
- Batteries can cause property damage such as burns if conductive material such as jewellery, keys or beaded chains touches exposed terminals. The material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse or other container with metal objects.

4.3 Injuries

- Do not place your device in the area over an air bag or in the air bag deployment area. Air bags inflate with great force. If a PMR is placed in the bag deployment area and the air bag inflates, the communicator may be propelled with great force and cause serious injury to the occupants of the vehicle.
- Keep the PMR at least 15 centimetres away from a pacemaker.
- Turn your PMR OFF as soon as interference is taking place with medical equipment.

4.4 Danger of explosion

- Do not replace batteries in a potentially explosive atmosphere. Contact sparking may occur while installing or removing batteries and cause an explosion.
- Turn your PMR off when in any area with a potentially explosive atmosphere. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.
- Never throw batteries in fire as they may explode.

Areas with potentially explosive atmospheres are often, but not always, clearly marked. They include fuelling areas such as below deck on boats, fuel or chemical transfer or storage facilities; areas where the air contains chemicals or particles, such as grain, dust or metal powders; and any other area where you would normally be advised to turn off your vehicle engine.

4.5 Poisoning danger

- Keep batteries away from small children.

4.6 Legal

- In some countries it is prohibited to use your PMR while driving a vehicle. In this case leave the road before using the device.
- Turn your PMR OFF when on board an aircraft when instructed to do so. Any use of the PMR must be in accordance with airline regulations or crew instructions.
- Turn your PMR OFF in any facilities where posted notices instruct you to do so. Hospitals or health care facilities may be using equipment that is sensitive to external RF energy.
- Replacing or modifying the antenna may affect the PMR radio specifications and violate the CE regulations. Unauthorised antennas could also damage the radio.

4.7 Notes

- Do not touch the antenna while transmitting, it could affect the range.
- Remove the batteries if the device is not going to be used for a long period.

5 Cleaning and maintenance

- To clean the unit, wipe with a soft cloth dampened with water. Don't use a cleaner or solvents on the unit; they can damage the case and leak inside, causing permanent damage.
- Battery contacts may be wiped with a dry lint-free cloth.
- If the unit gets wet, turn it off and remove the batteries immediately. Dry the battery compartment with a soft cloth to minimize potential water damage. Leave the cover off the battery compartment overnight or until completely dry. Do not use the unit until completely dry.

6 Disposal of the device (environment)

At the end of the product lifecycle, you should not throw this product into the normal household garbage but bring the product to a collection point for the recycling of electrical and electronic equipments. The symbol on the product, user guide and/or box indicate this.

Some of the product materials can be re-used if you bring them to a recycling point. By re-using some parts or raw materials from used products you make an important contribution to the protection of the environment. Please contact your local authorities in case you need more information on the collection points in your area.

7 Using a PMR device

To communicate between PMR devices they need to be set all on the same channel and CTCSS / DCS code (see chapter “13.7 CTCSS (Continious Tone Coded Squelch System) / DCS (Digital Coded Squelch)” and within receiving range (up to max. 10 km in open field). Since these devices use free frequency bands (channels), all devices in operation share these channels(total 8 channels). Therefore, privacy is not garanteed. Anybody with a PMR set to your channel can overhear the conversation. If you want to communicate (transmitting a voice signal) you need to press the **PTT-button** (12).

Once this button pressed, the device will go into transmit mode and you can speak into the microphone. All other PMR devices in range , on the same channel and in standby mode (not transmitting) will hear your message. You need to wait until the other party stops transmitting before you can reply to the message. At the end of each transmission the unit will send a beep if the Roger Beep is enable (see chapter “13.12 Roger Beep On/Off”). To reply, just press the **PTT-button** (12) and speak into the microphone.

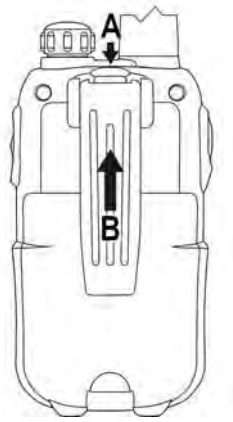
If 2 or more users press the PTT-button (12) at the same time the receiver will receive only the stongest signal and the other signal(s) will be supressed. Therefore you should only transmit a signal (press PTT-button (12) when the channel is free.

The range of radio waves is strongly affected by obstacles such as buildings, concrete/metal structures, the unevenness of the landscape, woodland, plants, … This implies that the range between two or more PMR's may in some extreme cases be restricted to a maximum of a few tens of meters. You will soon notice that PMR works best when there is a minimum of obstacles between users.

8 Included in the package

- 2 x MTD90
- 2 x Desktop Charger
- 2 x Power adapter
- 8 x AAA NiMh batteries
- User guide

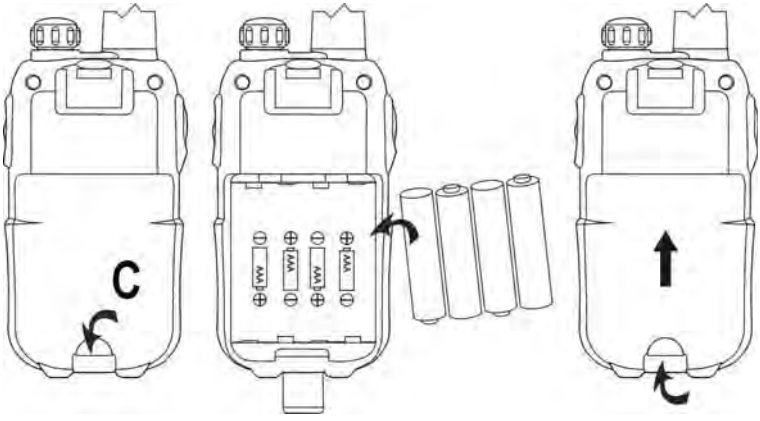
9 Getting started



9.1 Installing/Removing the Belt Clip

1. To remove the belt clip from the unit, push the belt clip (B) towards the antenna, while pulling the clip tab (A).
2. When re-installing the belt clip, a click indicates the bel clip is locked into position

9.2 Battery Installation



1. Remove the belt clip (see chapter “9.1 Installing/Removing the Belt Clip”)
2. Lift the battery door by gently pushing the door clip (C) using your finger nail.
3. Install the NiMh batteries. Make sure that the polarity of the NiMh batteries is correct.
4. Close the battery door.
5. Re-install the belt clip

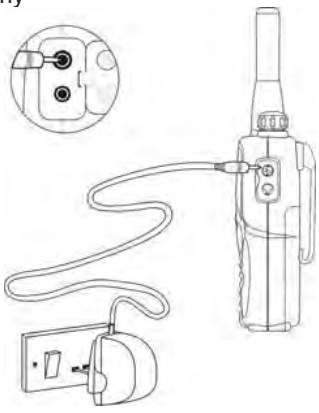
10 Charging the batteries

There are two ways to charge the battery of the PMR's :

10.1 Using the desktop charger

The desktop charger provides drop-in charging convenience.

1. Put the desktop charger on a flat surface.
2. Plug one end of the supplied adapter into an easy accessible electric socket and the other end into the connector on the backside of the desktop charger (28) *(See Page 1 - illustration 3)*
3. Put the radio in the charger as indicated.
4. The charging LED (29) will turn on if it's properly inserted and charging. (*See Page 1 - illustration 3*)



10.2 Connecting the power adapter directly to the PMR

1. Connect the connector of the power adapter directly to the charger connection (3) of the PMR.

It will take about 8 to 10 hours to fully charge the batteries.

Do not press the PTT-Button (12) of the PMR's while they are charging !

Do not short-circuit the batteries or dispose in fire. Remove the batteries if this device is not going to be used for a long period.
Do not charge non rechargeable batteries like Alkaline batteries in the charger. This might damage the PMR's and charger unit.

11 Description

(See Page 1 - illustration 3)

1. ON/OFF Volume knob
2. LCD display
3. Charger connection
4. Headset connection
5. TX LED (on when transmitting)
6. Call button
7. Menu button
   – Enter the menu settings
8. Microphone
9. Speaker
10. Down button
    – Select previous value in the menu
11. Up button
    – Select next value in the menu
12. PTT-button
13. Antenna
    See folded cover page - illustration 3
28. Charger connection
29. Charger LED (on when charging)

12 LCD display information

(See Page 1 - illustration 2)

14. CTCSS indication
15. DCS indication
16. CTCSS/DCS value
17. Frequency indication in MHz
18. MHz indication
19. Keypad lock icon
20. Call receive type indication
21. Battery level indication
22. Channel number
23. RX icon
    – Displayed when receiving
24. TX icon
    – Displayed when transmitting
25. VOX indication
26. Scanning indication
27. Dual channel mode (DCM) indication

The display illustrations in next pages only show the icons or display informations of the functions that are explained in the text.

13 Using the MTD90

13.1 Switching On/Off the PMR radio

- Turn the “On-Off/Volume Knob”① clockwise. A clicking sound will indicate that the PMR radio is switched on.
- Turn the “On-Off/Volume Knob”① fully counter clockwise. The clicking sound will indicate that the PMR radio is switched off.

13.2 Battery Charge Level/Low Battery Indication

The battery charge level is indicated by the number of squares present inside the battery icon on the LCD Screen.

Battery Full

Battery 2/3 charged

Battery 1/3 charged

Battery empty

When the battery charge level is low, the battery icon will flash and a beep will be heard to indicate that the batteries need to be replaced or recharged.

13.3 Adjusting Speaker Volume

- Turn the “On-Off/Volume Knob”① clockwise to increase the speaker volume.
- Turn counter-clockwise to lower the volume.

13.4 Receiving a Signal

The unit is continuously in the receive mode when the unit is switched ON and not transmitting.

In order for other people to receive your transmission, they must also be on the same channel and have set the same CTCSS code or DCS code. (See chapter “13.6 Changing Channels” and “13.7 CTCSS (Continues Tone Coded Squelch System) / DCS (Digital Coded Squelch)”. Either CTCSS or DCS can be used but never both at the same time.

13.5 Transmitting a Signal

- Press and hold the PTT - button (12) to transmit. The TX symbol is displayed.
- Hold the unit in a vertical position with the microphone 10cm from the mouth and speak into the microphone.
- Release the PTT - button (12) when you want to stop transmitting.

To check the channel activity use the monitor function (See chapter "13.8 Monitor").

13.6 Changing Channels

- Press the ⇨ - button (7) once, the current channel number flashes on the display.
- Press the ▲ - button or the -▼ button (10) to change the channel.
- Press the PTT - button (12) to confirm and return to stand-by mode.

If no button is pressed within 5 seconds during setting, the unit will return to standby.

13.7 CTCSS (Continious Tone Coded Squelch System) / DCS (Digital Coded Squelch)

License free PMR radio's operating on the 446 MHz frequency band, like the MTD90 PMR, have 8 available radio channels. If there are many PMR users in your neighborhood, there is a chance that some of these users are operating on the same radio channel.
To prevent that you receive signals from other users, sub-channels have been integrated. Two PMR radio's will only be able to communicate with each other when they are operating on the same radio channel and when they have selected exactly the same sub-channel.
There are two kind of sub-channels :

- Continuous Tone Coded Squelch System (CTCSS)
- Digital Coded Squelch (DCS)

When using CTCSS, a low frequency tone (between 67 and 250 Hz) will be transmitted along with the voice signal. There are 38 available tones to choose from. You are free to choose one of these 38 available tones. Due to filtering, these tones will generally not be audible so they will not disturb the communication.

DCS is similar to CTCSS, but instead of sending a continuous tone of a selected frequency, a digital data transmission is added to the radio signal. This Digital Code is transmitted at a really low rate, around 134 bits per second (the code is 23 bits long). Only the PMR's of the latest generation will support DCS. There are 83 available DCS codes that can be used. Since earlier models will only support CTCSS it will be better to use DCS to

13.7.1 CTCSS

- Press the ⇾ -button ⑦ twice : **"CTCSS"** and the current CTCSS code flashes on the display.
- Press the ▲ -button ⑪ or the ▼-button ⑩ to change to another code.
- Press the PTT-button ⑫ to confirm and return to stand-by mode.

13.7.2 DCS

- Press the ⇾ -button ⑦ three times : **"DCS"** and the current DCS code flashes on the display.
- Press the ▲ -button ⑪ or the ▼-button ⑩ to change to another code.
- Press the PTT-button ⑫ to confirm and return to stand-by mode.

To disable CTCSS or DCS, select code "00" for CTCSS or for DCS in the menu. When the entry is confirmed, "OF" will be displayed.

13.8 Monitor

You can use the monitor feature to check for weaker signals in the current channel.

- Press the ⇾ -button ⑦ and ▼-button ⑩ simultaneously to activate channel monitoring.
- Press the ⇾ -button ⑦ to stop channel monitoring.

During channel monitoring the receiver circuit in the PMR will not listen to CTCSS or DCS codes.

13.9 VOX Selection

The PMR is capable of voice activated (VOX) transmission. In VOX mode, the radio will transmit a signal when it is activated by your voice or other sound around you. VOX operation is not recommended if you plan to use your radio in a noisy or windy environment.

VOX mode will be overrided when you press the PTT - button ⑫.

- Press the ➔ - button (7) four times, the current VOX setting flashes on the display and the VOX icon is displayed.
- Press the ▲-button (11) to set the VOX sensitivity level between 1 and 3 (level 3 is the most sensitive level).
- Press the ▼ button (10) until **'OFF'** appears on the display, to turn VOX OFF.
- Press the PTT - button (12) to confirm and return to stand-by mode.

13.10 Channel Scan

Channel scan performs searches for active signals in an endless loop from channel 1 to 8. Once an active channel is found you have the option to search for the CTCSS code or the DCS code that is set by the user who is broadcasting on the channel.

13.10.1 Scanning for an active radio channel

- Press the ➔ -button (7) five times : **"SCAN"** and the current channel flashes on the display.
- Press the ▲ -button (11) or the ▼-button (10) to start the channel scan.

Once an active channel is found, the scanning will stop and you can listen to the transmission. When the transmission on the found channel stops, the scanning will resume automatically.

If you press the PTT - button (12) while listening to a found channel, the PMR will go back in stand-by mode on the found channel.

13.10.2 Scanning for a CTCSS code

When an active channel is found press the PTT button (12) to select the found active channel. Now you have to option to search for the CTCSS/DCS code that is used by the found user.

- Press the ➔ -button (7) six times : **"SCAN"** and **"CTCSS 00"** flashes on the display for the selected radio channel.
- Press the ▲ -button (11) or the ▼ -button (10) to start the CTCSS scan.

Once there is a transmission on the channel, the CTCSS code (if used) will be detected and displayed.

- **If you press the PTT - button ⑫ while listening to a found CTCSS code, the PMR will go back in stand-by mode on the channel with the CTCSS code.**
- **If no CTCSS code is detected there is a chance that DCS is selected by the user. In this case you can scan for the DCS code. (section 13.10.3)**

13.10.3 Scanning for a DCS code

- Press the ➔◇ -button ⑦ seven times : **"SCAN"** and **"DCS 00"** flashes on the display for the selected radio channel.
- Press the ▲ -button ⑪ or the ▼-button ⑩ to start the DCS scan.

Once there is a transmission on the channel, the DCS code (if used) will be detected and displayed.

If you press the PTT - button ⑫ while listening to a found DCS code, the PMR will go back in stand-by mode on the channel with the DCS code.

13.11 Call Tones

A call tone alerts others that you want to start talking.

13.11.1 Setting the Call Tone

The MTD90 has 15 call tones

- Press the ➔◇ - button ⑦ eight times, "**C**" is displayed and the current call tone is flashing.
- Press the ▲ - button ⑪ or the ▼ - button ⑩ to change to another Call Tone.
- Press the PTT - button ⑫ to confirm and return to stand-by mode.

13.11.2 Sending a call Tone

Press the •))) button ⑥ briefly. The call tone will be transmitted on the set channel.

13.11.3 Call tone reception type

- Press the ➔◇ -button ⑦ nine times.
- Press the ▲ -button ⑪ or ▼ -button ⑩ to select the call tone reception type.
  1. Tone only
  2. Tone + vibration
  3. Vibration only

Press the PTT-button ⑫ to confirm and return to stand-by mode.

13.12 Roger Beep On/Off

After the PTT-button (12) is released, the unit will send out a roger beep to confirm that you have stopped talking.

To set the Roger Beep.
- Press the ⇨ - button (7) ten times. **'rO'** will be displayed.
- Press ▲ button (11) to enable **(ON)** or ▼ button (10) to disable the Roger-Beep **(OFF).**
- Press the PTT - button (12) to confirm your selection and return to the standby mode.

13.13 Key-Tone On/Off

When a button is pressed, the unit will beep briefly.

To set the key-tone.
- Press ⇨ button (7) eleven times. **'tO'** will be displayed.
- Press ▲ button (11) to enable **(ON)** or ▼ button (10) to disable the Key Tones **(OFF).**
- Press the PTT - button (12) to confirm your selection and return to the. standby mode.

13.14 Dual Channel Monitor function

In stand-by, the PMR is set on one channel with CTCSS/DCS code. The PMR will only receive signals transmitted on that channel with the CTCSS/DCS code.
Dual Channel Monitor (DCM) allows you to monitor a second channel with CTCSS/DCS code.

- Press the ⇨ -button (7) twelve times,**" DCM OFF"** will flash on the display.
- Press the ▲ -button (11) or the ▼-button (10) to change the channel.
- Press the ⇨ -button (7) to confirm the channel selection and go to CTCSS selection. (Press the ⇨ -button (7) again to go to DCS selection)
- Press the ▲ -button (11) or the ▼-button (10) to change the CTCSS code or DCS code.
- Press the PTT-button (12) to confirm and return to stand-by mode.
- To disable the function select **"OFF"** when selecting the DCM channel.

When the Dual Channel Monitor function is activated, the PMR will switch sequentially between the standby channel + CTCSS/DCS code and the Dual Channel + CTCSS/DCS code.

13.15 Button Lock

- Press and hold the ⇾◇ -button ⑦ for three seconds to activate the Button lock mode. The button lock icon is displayed on the LCD Screen.
- Press and hold the ⇾◇ -button ⑦ again for three seconds deactivate button lock

The PTT-button ⑫, the •)) -button ⑥ and the ⏻ -button ① will still be functional when the Button Lock is activated.

13.16 Display back light

To activate the backlight of the LCD display, press any button except the PTT- button ⑫ or the •)) button ⑥ .
The LCD backlight will light up for 6 seconds.

14 Earpiece connection

The connector is located on the upper side of the unit ②.
Insert the earpiece plug into the connector (2,5mm jack).
The small button on the earpiece has the same function as the PTT - button ⑫ on the unit
When you use the PTT - button ⑫ from the Earpiece, you must also use the microphone from the earpiece to talk into.

Do not connect other earpieces. This may damage your device.

15 Troubleshooting

No power	Clean the battery contacts with a soft cloth. Replace the batteries.
No transmission	Make sure the PTT - button ⑫ is pressed completely before you speak. Monitor the channel activity and switch to another channel if the current is used.
No reception	Check the speaker volume. Make sure that you are in the reception range of the sender and change if necessary your location.

Limited Range and noice during transmission	The talking range depends on the terrain. Steal constructions, concrete buildings or the use in vehicles have a bad influence on the range. Try to avoid as many obstacles as possible and communicate in a clear line of sight. Change your locations.
Interference	The receiver and transmitter are too close. The mimimum distance between 2 units is 1,5m.

16 Technical specifications

Channels	8
Sub-code	CTCSS 38 / DCS 83
Frequency	446.00625MHz - 446.09375 MHz
Range	Up to 10 Km (Open field)
Battery	4 x 1.2 V NiMH rechargeable
Transmission Power	=< 500mW ERP
Modulation Type	FM - F3E
Channel spacing	12,5 kHz
Duo Charger adapter	Input : 230V AC / 50Hz - Output : 9 V DC / 300mA

Channel Frequency Chart:		**CTCSS Code Chart**							
Channel	Frequency (MHz)	Code	Frequency (Hz)	Code	Freq. (Hz)	Code	Freq. (Hz)	Code	Freq. (Hz)
1	446,00625	0	Disabled	10	94,8	20	131,8	30	186,2
2	446,01875	1	67,0	11	97,4	21	136,5	31	192,8
3	446,03125	2	71,9	12	100,0	22	141,3	32	203,5
4	446,04375	3	74,4	13	103,5	23	146,2	33	210,7
5	446,05625	4	77,0	14	107,2	24	151,4	34	218,1
6	446,06875	5	79,7	15	110,9	25	156,7	35	225,7
7	446,08125	6	82,5	16	114,8	26	162,2	36	233,6
8	446,09375	7	85,4	17	118,8	27	167,9	37	241,8
		8	88,5	18	123,0	28	173,8	38	250,3
		9	91,5	19	127,3	29	179,9		

DCS Code Chart							
No	DCS code	No	DCS code	No	DCS code	No	DCS code
0	Disabled	21	134	42	311	63	516
1	23	22	143	43	315	64	532
2	25	23	152	44	331	65	546
3	26	24	155	45	343	66	565
4	31	25	156	46	346	67	606
5	32	26	162	47	351	68	612
6	43	27	165	48	364	69	624
7	47	28	172	49	365	70	627
8	51	29	174	50	371	71	631
9	54	30	205	51	411	72	632
10	65	31	223	52	412	73	654
11	71	32	226	53	413	74	662
12	72	33	243	54	423	75	664
13	73	34	244	55	431	76	703
14	74	35	245	56	432	77	712
15	114	36	251	57	445	78	723
16	115	37	261	58	464	79	731
17	116	38	263	59	465	80	732
18	125	39	265	60	466	81	734
19	131	40	271	61	503	82	743
20	132	41	306	62	506	83	754

17 Warranty

17.1 Warranty period

The devices have a 24-month warranty period. The warranty period starts on the day the new unit is purchased. There is no warranty on standard or rechargeable batteries (AA/AAA type). Consumables or defects causing a negligible effect on operation or value of the equipment are not covered. The warranty has to be proven by presentation of the original or copy of the purchase receipt, on which the date of purchase and the unit-model are indicated.

17.2 Warranty exclusions

Damage or defects caused by incorrect treatment or operation and damage resulting from use of non-original parts or accessories are not covered by the warranty.
The warranty does not cover damage caused by outside factors, such as lightning, water and fire, nor any damage caused during transportation. No warranty can be claimed if the serial number on the units has been changed, removed or rendered illegible. Any warranty claims will be invalid if the unit has been repaired, altered or modified by the buyer

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